

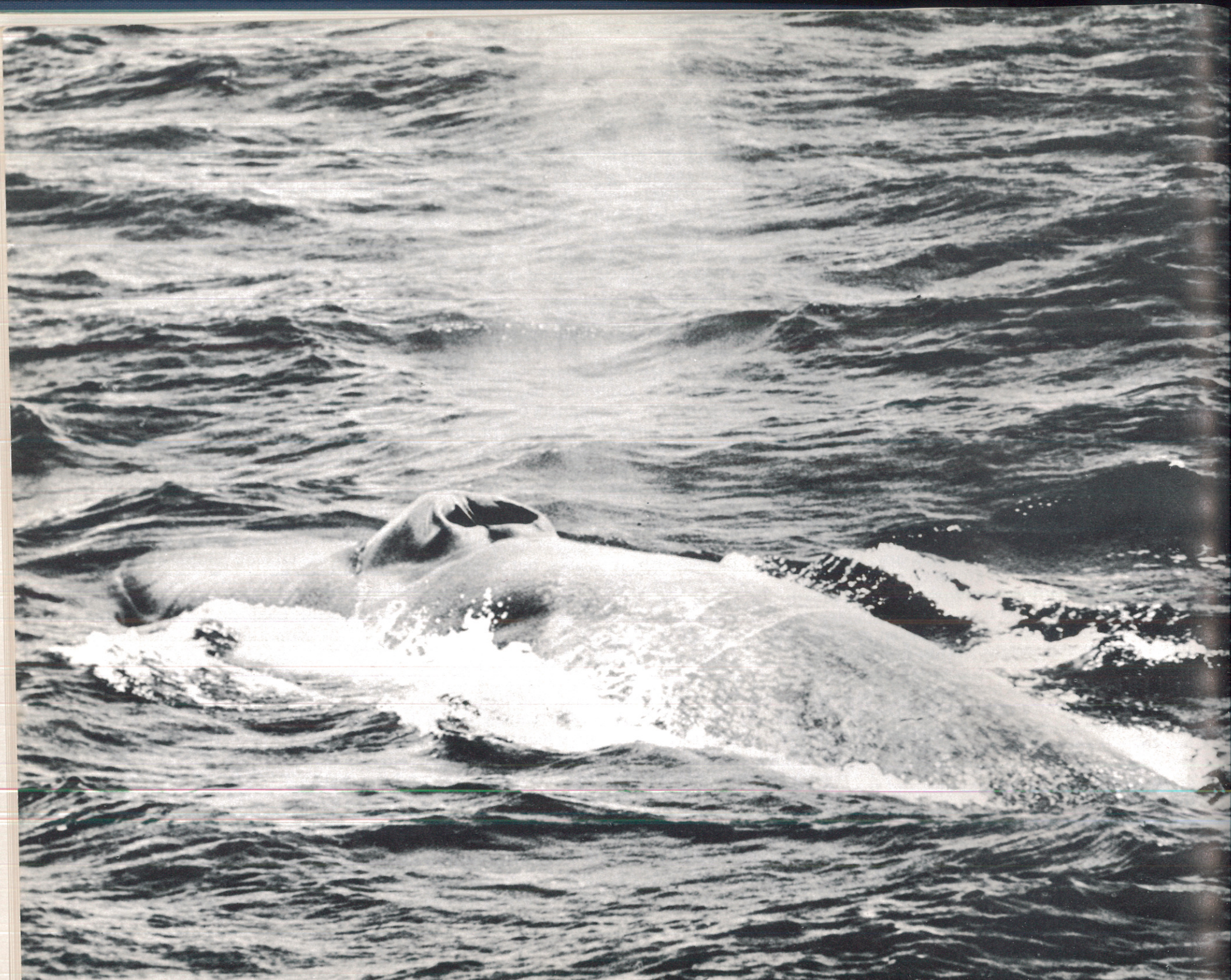
Pacific Search Press

# *Marine Mammals*

*Edited by Delphine Haley*

QL  
713.2  
M36  
1978







# Blue Whale

by Dale W. Rice

*"Ballena! Ballena azul!"* I had almost dozed off in the warm sun on the flying bridge of the whale catcher *Lynnann* when Ernesto's cry from the crow's nest jerked me to attention. Three miles off our port beam a thin jet of vapor rose from the water, drifted downwind, and dissipated. Then I spotted two great, blue green shadows gliding under the gentle swells. In a moment, they broke the surface and sent up two more plumes of vapor. Ernesto repeated his cry: "Blue whales! Two, maybe three!" With a quick sighting over the compass binnacle, I kicked out the "iron mike" that had been holding us on course and spun the wheel to port. *Lynnann* heeled hard over in a tight turn—a maneuver that brought the rest of the crew scurrying up from the galley. There is no whaler and no whale biologist, no matter how experienced, who is so jaded that his heart does not race at the sight of a blue whale.

Fifteen minutes of hard steaming brought us close to the whales. Captain Bud Newton took the wheel for the stalk. I positioned myself on the gun platform on the bow, but the big ninety-millimeter

harpoon cannon remained unloaded and covered. I was armed instead with a twelve-gauge shotgun that fired ten-inch, pointed, stainless steel tubes, each inscribed with a number and the message "Notify U.S. Fish and Wildlife Service." The next time the whales surfaced and blew, the skipper put us on collision course with them. A few minutes later I spotted one of them in the clear water just ahead of us. Powerful rhythmic strokes of its sixteen-foot-wide flukes effortlessly propelled its streamlined bulk through the water. After an eternity, the huge flat head broke the surface and the animal blew with a loud "whooooosh" only twenty-five yards away. Braced on the pitching platform, I fired just as the whale arched its giant back to submerge. It did not even flinch as the marker buried itself in the back muscles—a mere mosquito bite.

These blue whales, which congregate off the coast of Baja California every year from February to June and again in October, represent one of the last sizable stocks of blue whales left on the earth. On several occasions, I have encountered aggregations of as many as fifty to sixty animals. By marking

*With its double blowhole wide open, a blue whale surfaces off Baja California. The blue whales in this area represent one of the last sizable stocks left in the world. (Ken Balcomb)*



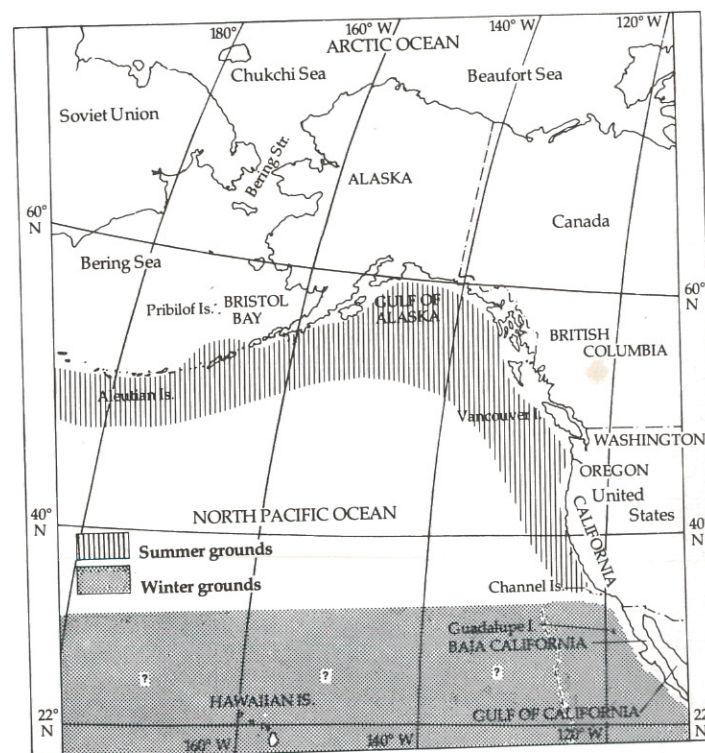
some of these animals, we hoped to trace their migration routes. If any had been killed on the whaling grounds farther north, the marks would have been discovered in their flesh and we could have determined exactly where they spent the summer.

Unfortunately for science—but fortunately for the survival of the species—hunting of blue whales was banned in 1966, shortly after our marking program got under way. Recent observations give some indication of their winter grounds, however. During the 1975 Soviet-American Whale Research Cruise on the catcher boat *Vnushitel'nyi*, we saw several small groups of blue whales about seven hundred miles off the coast of Guatemala (lat 08° N, long 94° W). Another stock of blue whales spends the winter in the western North Pacific from southwestern Honshu to Taiwan, and a few have also been sighted in the mid-Pacific between twenty and thirty-five degrees north latitude.

During the summer, the North Pacific blue whales range in the immediate offshore waters from central California and the northeastern coast of Honshu north to the Gulf of Alaska and the Aleutian chain. They rarely enter the Bering Sea, but have occasionally been observed as far north as the Chukchi Sea.

Besides the North Pacific, blue whales have been found almost everywhere else in the world's oceans at one time or another. They range from the tropics north through the North Atlantic to the Arctic Ocean north of Spitsbergen (lat 85° N), and south throughout the Southern Hemisphere to the Ross Sea of Antarctica (lat 78° S).

The blue whale (*Balaenoptera musculus*) is the largest of the rorquals, a family of baleen (whalebone) whales characterized by their pleated or corrugated throats. The six species of rorquals range in size down to the little minke whale, which is only thirty feet long. Aside from its great size, the blue whale may be distinguished by its blue gray color that is mottled with lighter gray; only the



Blue whale distribution

undersides of its flippers are white. The dorsal fin is small—little more than a step in the ridge of its back—and its tongue, palate, and baleen plates are inky black.

Although the blue whale is the largest animal that has ever lived, it is difficult to separate fact from fiction when you try to find out how big it gets. Although blue whales over one hundred feet long have been reported, such measurements have never been properly documented. After combing the literature and questioning whale biologists from all over the world, I find that the longest blue whale (measured in the standard zoological manner—in a straight line from the tip of the snout to the notch between the tail flukes) that can be authenticated was a ninety-eight-foot female examined by Dr. Masaharu Nishiwaki of the



Japanese Whales Research Institute in the Antarctic in the 1946–1947 season. The heaviest blue whale on record is an eighty-nine-foot female that was cut up and weighed, piece by piece, aboard a Japanese floating factory ship in the Antarctic on 27 January 1948. She weighed 285,600 pounds. Allowing for a twelve percent loss of blood and body fluids, she must have weighed about 320,000 pounds when alive. The largest blue whale that I have examined in the North Pacific was an eighty-two-foot female killed off San Francisco on 23 September 1959. This animal weighed 181,200 pounds and must have weighed about 203,000 pounds when alive. She yielded 52,500 pounds of meat.

The blue whale becomes sexually mature at about ten years. From then on, each female gives birth to a calf once every two or three years. The mating season extends over about five months in the late fall and winter, and the gestation period lasts about a year. Because the annual cycles of Southern Hemisphere and Northern Hemisphere blue whales are six months out of phase, they cannot interbreed.

At birth, the blue whale calf is about twenty-three feet long and weighs some 5,500 pounds. During the nursing period, its mother must supply over fifty gallons of milk a day. This milk contains thirty-five to fifty percent fat and enables the calf to gain weight at the prodigious rate of over 200 pounds a day or some 9 pounds per hour. At the age of seven months, when it is weaned, the calf is fifty-two feet long and weighs 50,000 pounds.

Of all the large whales, the blue whale is the most particular about its diet. It is not known to feed on anything other than certain species of krill—small shrimplike crustaceans—from one part of the world to another. In the Antarctic Ocean, blue whales eat *Euphausia superba*, a “giant” species of krill that reaches a length of over two inches. Off California and in other parts of the North Pacific, the main species is *Euphausia pacifica*, which is less

than an inch long; of secondary importance is a slightly larger species called *Thysanoessa spinifera*. In whatever part of the world, all the species of krill that are selected by the blue whale share two characteristics: They congregate in large, dense shoals and they live fairly close to the surface. The only possible exception to this exclusive diet of euphausiids occurs off Baja California, where I have observed blue whales apparently feeding on “red crabs” (*Pleuroncodes planipes*). These look like tiny lobsters and, like the euphausiids, often gather in immense shoals at the surface.

An average blue whale weighing seventy-five or eighty tons probably requires about 1.5 million calories a day. Since it fasts for much of the winter, it must consume about twice this amount—or 3 million calories a day—during the summer months. One pound of *Euphausia pacifica* supplies about 400 calories. This means that the whale must consume about four tons of krill every day. Its stomach holds about a ton, so it eats four full meals daily. Because *Euphausia pacifica* weighs only one tenth of a gram, it takes about forty million of these krill to sustain one blue whale for one day.

To obtain this immense quantity of food, a blue whale must filter thousands of cubic yards of water through the sievelike series of baleen plates—about 360 on each side—that grow in its upper jaw. Most species of baleen whales fall into two groups on the basis of their feeding behavior: the “skimmers”—such as the right whale and the sei whale—which swim along with their mouths wide open, and the “gulpers”—such as the blue whale. When a blue whale encounters a shoal of krill, it rolls on its side, presumably to allow more maneuverability in the horizontal plane. Its huge, U-shaped lower mandible hangs open about fifty degrees and its pleated throat balloons out. It slowly engulfs a mass of krill, closes its mouth, and by tightening its throat muscles, sends the water streaming out through its baleen plates, leaving the



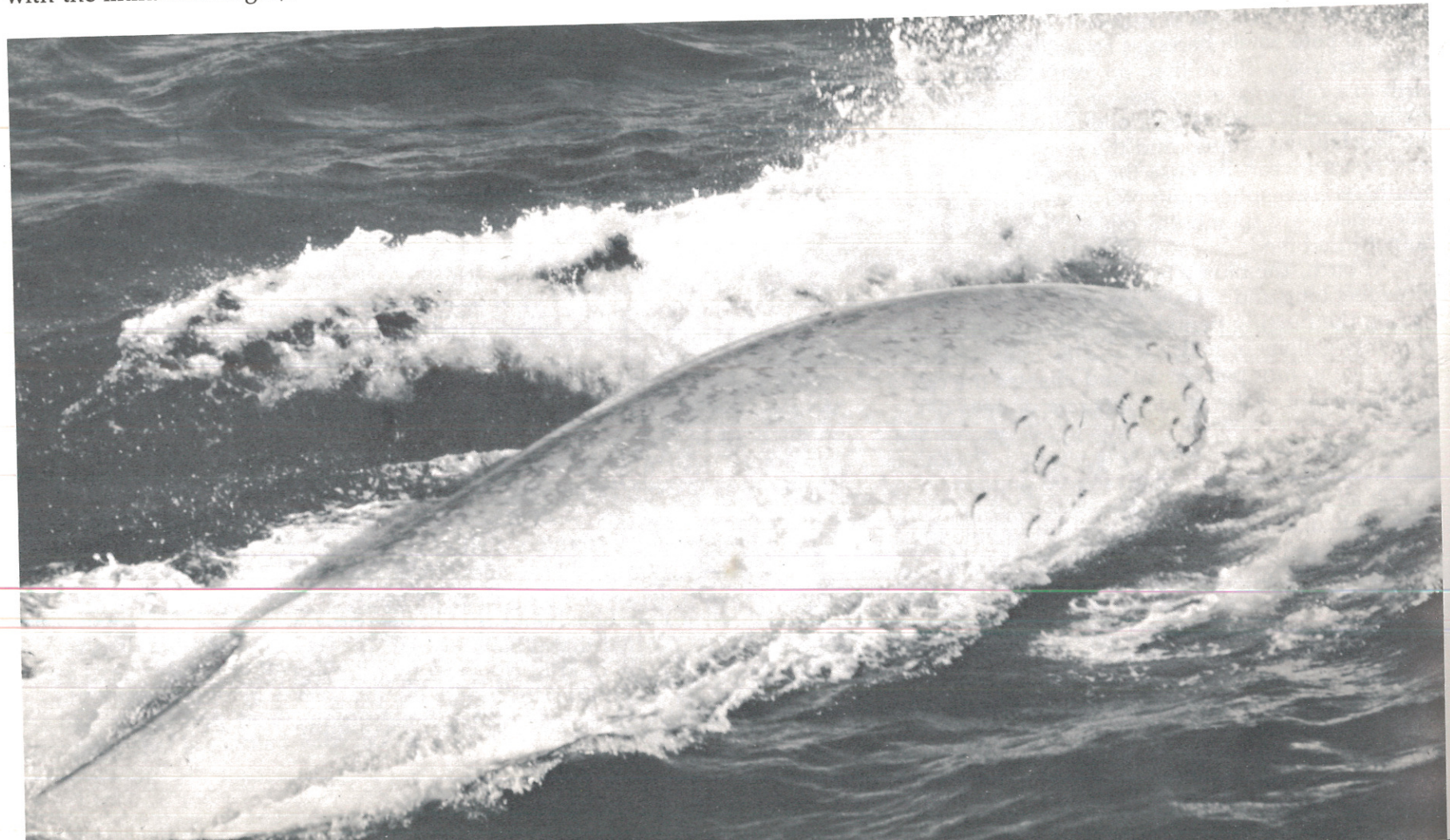
krill trapped on the fibrous fringes of the inner edges of the baleen plates. Its huge, fleshy tongue then scrapes the krill back to the gullet. The whale repeats this process, hour after hour, day after day.

Probably because of its fastidious diet, the blue whale is much less prone to infestations of parasitic worms than are other species of baleen whales. In examining stomachs of blue whales, I have never found herring-worms (*Anisakis simplex*), which other species of baleen whales often harbor in great numbers (apparently picked up by eating fish infested with the immature stages). About half the blue

whales taken off California carried thorny-headed worms (*Bolbosoma nipponicum*) attached to the lining of the small intestine. The only other internal parasite I have found was a giant kidney worm (*Crassicauda crassicauda*), which was present in about one quarter of the animals examined.

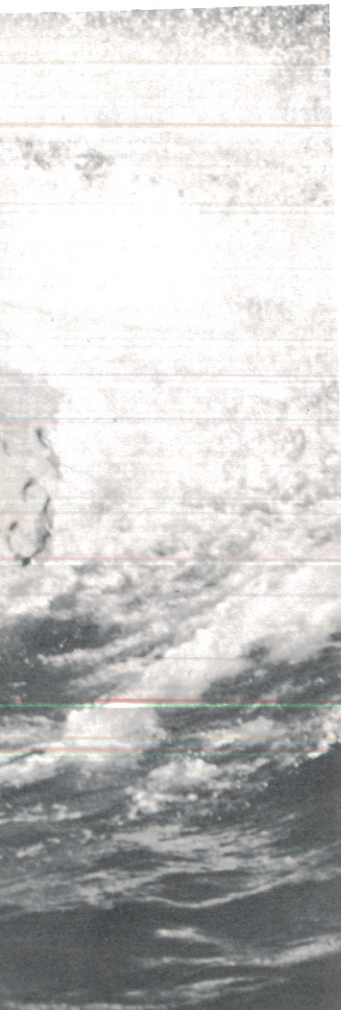
The blue whale usually does not carry many ectoparasites either. The few it does have are some of the most peculiar creatures in the animal kingdom. *Penella*, a crustacean of the order Copepoda, is so highly specialized that, at first glance, it is not even recognizable as an animal. The female of this

*Hitchhiking suckerfish cling to the mottled back of a surfacing blue whale, the largest animal that has ever lived.*  
(Dale W. Rice)





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species grows anchored in the whale's blubber by a three-pronged, tripod-shaped "root," between the "legs" of which is the rounded head. Its stemlike "neck," which is several inches long, protrudes from the whale's skin and is terminated by a thickened "trunk," which bears a fringe of gill filaments and two long, threadlike ovipositors. The male (rarely seen by zoologists) is a tiny creature that looks more like a normal crustacean.

A barnacle called *Xenobalanus globicipitis* is another unique ectoparasite. Although a true sessile barnacle, it looks more like one of the stalked or gooseneck barnacles because the shell is reduced to a small, star-shaped structure. Most of its body—which may be over two inches long—protrudes from the shell; it is long and cone-shaped with a downturned "collar" through which its cirri (legs) protrude. This barnacle selects as its habitat the trailing edge of the tail flukes and occasionally the tips of the flippers or dorsal fin. On one whale, I found several hundred forming a solid rank along the hind margin of the flukes; in such a position, they must withstand a terrific water velocity when the whale is swimming fast. These barnacles are not true parasites but filter their own food from the water flowing past the whale. Blue whales rarely carry "whale lice" (really amphipod crustaceans) of the species (*Cyamus balaenopterae*) that also occurs on other species of rorquals.

Just as the barnacles "ride" the whale in order to take advantage of the food-carrying water currents, other fellow travelers have adapted themselves to exploit the tremendous volume of water that flows between the baleen plates. Such uncountable millions of *Balaenophilus unisetus*, an almost microscopic copepod crustacean, live on the baleen plates that these ectoparasites form a whitish scum. "Big fleas have little fleas . . .," and so *Balaenophilus* carries on its body and legs many jug-shaped ciliate protozoans belonging to a still undescribed genus. Another denizen of the baleen

plates is a tiny roundworm called *Odontobius ceti*.

One of the most interesting creatures that makes the blue whale its home is the whale sucker (*Remora australis*), a fish related to the more familiar shark sucker. This fish has been found only on cetaceans of several species—both large and small—but shows a decided preference for the blue whale. I have seen dozens clinging to the sides of a blue whale, but like many of the blue whale's coterie of hangers-on, the whale suckers simply go along for the ride and catch their own food en route (a biological relationship called phoresy). One fish, however, is not such a harmless hitchhiker. This is the Pacific lamprey (*Entosphenus tridentatus*), which uses its suckerlike mouth and sharp teeth to bite into the whale's skin, where it leaves wounds, which become distinctive scars.

The blue whale was too swift and powerful for the nineteenth-century whalers to pursue with their open boats and hand harpoons. But by the early 1900s, following the invention of the harpoon cannon, the blue whale (because of its large size) became the most sought-after target of whalers the world over. Floating factory ships and fleets of catcher boats pursued the whales far into the Antarctic pack ice. The slaughter reached a peak in 1931 when 29,649 blue whales were killed throughout the world. Although there was a brief respite during World War II, the slaughter continued afterward. By 1966, the species was so scarce that it formed an insignificant portion of the world's whale catch. The International Whaling Commission then belatedly afforded the blue whale complete protection throughout the world. The original blue whale population in the early 1900s probably numbered over two hundred thousand. Today, there are only about twelve thousand blue whales left in the entire world—ten thousand in the Southern Hemisphere, fifteen hundred in the North Pacific, and a few hundred in the North Atlantic.